GEOGRAPHIC SCHOOL BULLETINS

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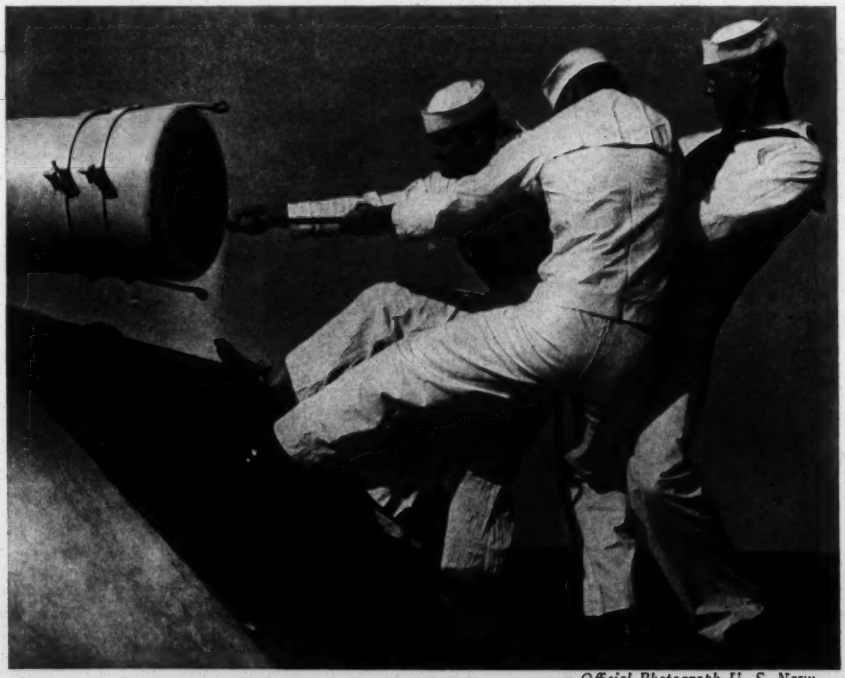

Official Photograph U. S. Navy

WHAT FIRES THE GUNPOWDER THAT FIRES THE GUN?

For each projectile it fires, the modern gun requires a supply of gunpowder in silk bags and a portion of "primer mixture." The primer mixture explodes and ignites the gunpowder, which in turn explodes and shoots the shell from the gun. Then the gun must be cleaned; here several men pull a giant brush through the bore (photographed on the *U.S.S. Arkansas*). Sparks from flint were used to fire the powder until 1807, when a Scottish clergyman, Alexander Forsyth, patented the first primer mixture (of sulphur and potash) and made the old flintlock muskets obsolete. The standard primer mixture today contain antimony, which is one of the "strategic materials" necessary for U. S. defense (Bulletin No. 5).

HOW TEACHERS MAY OBTAIN THE BULLETINS

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General Headquarters, Washington, D. C.

The Big Four of Russia's Beleaguered Cities

BOMBS OVER MOSCOW HAVE EXTRA THREAT

IN BOMBING Moscow, German planes have attacked one of Europe's most congested population centers. The Soviet capital has more people per square mile than London or New York City. London's "average" square mile, in normal times, has 11,850 inhabitants; Berlin's, 12,700; New York's, 24,999; and Moscow's, 38,200.

The congestion of city dwellers clustered around the Kremlin climaxes a growth that began in 1861, when the abolition of serfdom gave Russian peasants their first freedom to move from feudal country estates into towns. Then Moscow had barely 380,000 inhabitants. By 1915 it had nearly two million.

Since the World War and the Revolution gave the Russians their "Mother Moscow" as a capital again, the city's population has increased to the November, 1940, figure of 4,342,000. But the closely packed metropolis covers only 113 square miles, to New York's 299 and London's 692.

This very congestion has inspired housing and traffic arrangements which may bring safety during a bombing raid. New housing has taken the form principally of tall apartment buildings of reinforced concrete, offering more bomb-proof protection than single dwelling units. Traffic jams necessitated underpasses at many street intersections and tunnels under large open squares, which may supplement the city's much-talked-of subways as air raid shelters.

LENINGRAD IS NORTHERN HUB OF SOVIET INDUSTRY

The second city and former capital of Russia, Leningrad, is a vital pivot point of the defenses of all western Russia, with its factories for precision tools, instruments, machinery, and munitions. Before the war it had 3,200,000 inhabitants.

Called St. Petersburg till 1914, then Petrograd till 1924, it is Russia's "window to look out on Europe," built in 1702 by Peter the Great (illustration, next page). Palaces and broad boulevards were constructed, but disease and hardship killed so many workers that St. Petersburg was said to be "built on bones."

The heart of Leningrad is the vicinity of the Old Admiralty building, the former Winter Palace (now a museum), and the wide streets radiating from them. "Main Street" is the Twenty-fifth of October Prospekt, named after the date of the 1917 birth of the Soviet government. The huge palaces and ornate private homes of Tsarist days are now museums, hospitals, schools, and clubs. At the outbreak of German-Russian fighting, the splendid Hermitage Museum contained one of the world's finest collections of art.

Numerous rail lines serve the southern parts of Leningrad, where the electrical machinery, tractor, engine, chemical, furniture, rubber and leather goods, and textile industries of the city largely are concentrated.

KIEV RANKS THIRD AMONG SOVIET CITIES

Kiev, capital of the Ukraine and third largest Russian city, is approximately the size of Milwaukee or Buffalo, and lies about 280 miles north of the Black Sea port of Odessa. In the Middle Ages Kiev ranked with London and Paris commercially.

The older portion of the city, once the capital of all Russia, occupies a lofty, fortified cliff overlooking the Dnieper River. The lower city, along the river bank,

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Photograph by Gomez

VOICES ON A TELEPHONE WIRE CROSS THE LOFTY PASS WHERE THE CHRIST OF THE ANDES KEEPS VIGIL

On a mountain pass 12,796 feet high in the Andes, this 26-foot statue made of melted-down Argentine cannon was set up in 1904 on the boundary line between Argentina and Chile to mark the two nations' vows of perpetual peace. Now an international telephone cable crosses the pass, at an altitude of two miles above sea level. Just off the coast of Chile, a submarine cable lies 21,000 feet deep. To protect wires at both these extremes, cables usually are sheathed in lead hardened with antimony. A lead alloy with 25 per cent antimony is twelve times harder than lead (Bulletin No. 5).

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Seaplane Base for Palmyra, Where Crabs Pick Coconuts

(This is the eleventh of a series on the new U. S. defense bases.)

THE new U. S. Naval Air Station on Palmyra Island in mid-Pacific gives Uncle Sam a little outpost for his big outpost of Hawaii.

Often lost and rediscovered, Palmyra lies just north of the Equator about 975 miles southwest of Honolulu. It is the first habitable spot of land to be encountered on a southward hop over the Pacific from Hawaii. By a freak of city government, until it was taken over by the U. S. Navy in December, 1940, the island was considered to be within the city limits of Honolulu nearly 1,000 miles away!

Coconuts Appear To Grow in Mid-Ocean

Within 200 miles of Palmyra lie the dangerous Kingman Reef and Washington Island and Fanning Island, the latter a Pacific cable station. These neighbor islands of Palmyra are claimed by Britain, and claims for Palmyra also have been advanced by the British Empire, as well as by the old monarchy of Hawaii.

Palmyra is actually a family circle of islands, a coral-built atoll 5½ miles long, enclosing a three-basin lagoon. In 53 patches the coral rock rises high enough above sea level to become islets, separated by shallow channels of water. The largest of these, Eastern and Cooper Islands, lie on the north and east. But even the largest has an area of only 46 acres. The entire atoll is rimmed by a jagged coral barrier reef about eight miles long, over which the Pacific rolls and crashes.

The whole group is so flat and low—about six feet above sea level—that storms bring heavy damage and occasional abnormally high waves menace the entire land area. To approaching ships the low ground is still invisible while the towering columns of coconut trees—sometimes 60 to 90 feet high—appear to be growing straight out of the ocean.

Natives Disappeared During the Past Century

When the United States sent an exploring expedition into the Pacific in the 1830's, Commander Wilkes reported crude but not unfriendly natives living on the luxuriant tropical isles of Palmyra. But the natives have disappeared. In recent years the island's chief inhabitants have been noisy sea fowl, the frigate birds and terns, the gulls and gannets. Among Palmyra's most prominent wild life citizens are the coconut crabs, which leave the water and climb the tall coconut trees to get coconuts for food.

Earliest among the numerous "discoverers" of Palmyra probably was Capt. Edward Fanning, who claimed that he reached the island in his American ship the *Betsey* in June, 1798. The atoll bears the name of another American vessel, the *Palmyra* of Capt. Sawle, who arrived in 1802. Palmyra, listed also under its alternate name of Samarang, appeared among the Pacific isles claimed for the United States under the Guano Act in the 1850's.

Nevertheless, King Kamehameha IV in 1862 allowed Capt. Zenas Bent to claim Palmyra for Hawaii, and to plant there a five-man colony as well as a garden patch of corn, watermelons, and beans. A third flag was hoisted among the island's coconut trees in 1889, when the British Commander Nichols claimed it for Queen Victoria. But Uncle Sam got the island on two counts, taking it over again with all the territory of Hawaii in 1898.

The U. S. Navy sent the U.S.S. *Portsmouth* to inspect the island as early as

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is congested with the flow of goods between river and railroad, warehouse and shop.

The Dnieper River and numerous railroads make this city the center of the Dnieper Plateau, with its busy factories and home industries, its agriculture, fruit culture, and cattle raising.

Normally 25,000 students throng Kiev's several technical schools, its scientific laboratories, Academy of Sciences, its many museums, and its National Library of two million volumes.

Kiev was the capital of St. Vladimir, who established the Greek Church as the state religion of Russia in 988. Later this religious center became the "Ukrainian Jerusalem," attracting thousands of pilgrims to its catacombs and its 150 churches. Some of the church domes, now exposed to air raids, are sheathed in gold. The Sophia Cathedral is the oldest in Russia.

KHARKOV, HUB OF UKRAINIAN INDUSTRY

Although the capital of the Ukrainian S.S.R. was shifted from Kharkov to Kiev in 1934, Kharkov's growing industries by 1939 had raised its population to more than 830,000, to rank it as Russia's fourth largest city.

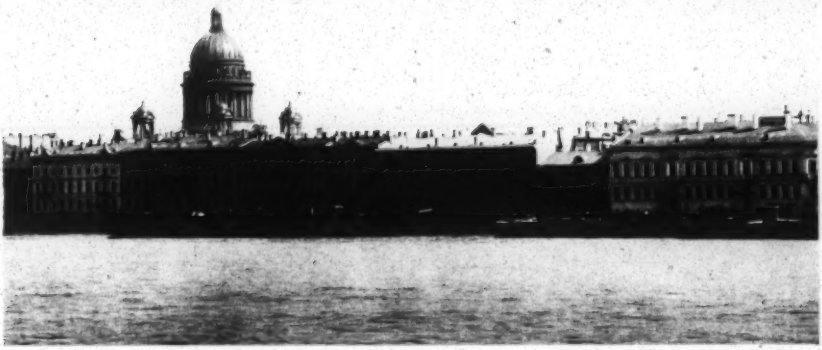
Kharkov's importance was based on the rich coal fields of the Donets Basin and the extensive Krivoi Rog iron district. In normal times the city's numerous factories turned out various products, ranging from dynamos to candies, from locomotives, tractors and bicycles to chemicals, electrical goods, carved wood, and prepared foods. With the vast and fertile "black earth" areas of the Ukraine to serve, Kharkov made a specialty of farm machinery.

On the main routes between administrative Moscow on the north and the Crimea and the rich oil lands of the Caucasus to the south, Kharkov is the hub of six railway lines, and in normal times is served by regular air lines.

Note: These largest Russian cities as well as other localities are described in "Some Impressions of 150,000 Miles of Travel," in the *National Geographic Magazine*, May, 1930; and "Russia of the Hour," November, 1926.

For exact locations and surroundings, see the Society's Map of Europe and the Near East, which may be ordered from the Society's headquarters in Washington, D. C.

Bulletin No. 1, October 20, 1941.



Photograph by J. and P. Parikas

LENINGRAD'S LANDMARKS ARE STILL THE NEVA AND ST. ISAAC'S

German invaders recently undertook to prove their nearness to Leningrad by publishing a picture of St. Isaac's Cathedral dome, said to have been photographed from German lines. The Cathedral rises above the banks of the Neva, the river which determined the city's location. Peter the Great, desiring at least one Baltic port to give Russia access to Europe's commerce, commanded that a city be built where the Neva emptied into the Gulf of Finland. Until the Baltic republics of Estonia, Latvia, and Lithuania came under Soviet sway in 1940, Leningrad for more than a century and a third remained Russia's only port on the Baltic.

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Pipe Lines, the Underground Arteries of Oil

HEAT for homes equipped with oil-burning furnaces, use of automobiles, delivery of food to stores, maintenance of bus schedules, operation of school busses—countless phases of community life depend on petroleum and gasoline. Since the transfer of tankers to Britain put a strain on other facilities for delivering oil to the Atlantic seaboard of the United States, pipe lines have been receiving special attention.

Close to 98 per cent of the oil pumped out of United States wells moves, at some stage between earth and engine, through pipe lines. Of the approximately four million barrels of oil a day produced by the United States, the States in the thickly populated Atlantic area need about 1½ million barrels, and the pipe line network is being extended to help fill the need.

Enough U. S. Pipe Lines To Encircle the Earth 13 Times

In 1917, the United States had 50,000 miles of pipe lines; in 1940, some 126,400 miles. Additional mileage built last year would reach twice across the United States. Now the total length of oil, gasoline, and natural gas lines hard at work underground in the nation would make almost 13 loops around the earth.

Sections of steel pipe welded together form the pipe line network. The pipe varies from 6 inches to 24 inches in diameter (illustration, next page). The lines usually tunnel under roads, railroads, and streams, although they may come out into the open at the banks of some rivers and cross the water on bridges. The process of laying the pipe line is speeded by efficient mechanical ditch-diggers, and by trucks and tractors which haul the pipe into place and bend it.

Gravity alone moves oil through some pipe systems. On other lines, pumping stations step up the flow by pushing the oil along at intervals of 50 or 100 miles. When pipes have to be cleaned, maintenance men send through a "go-devil"—a mechanical circular scraper that works like a big bit auger.

Several Lines Take Oil on 1,000-Mile Trips

Existing pipe lines, however, bring only about 50,000 barrels of crude and refined oil products into the New York area. New lines are under construction from Florida to Maine, and the most spectacular project of all is still under consideration.

The debated pipe line would transfer crude oil from Texas and Louisiana fields all the way to Pennsylvania and New Jersey. It was planned to deliver 250,000 barrels of oil daily to the big refineries at Marcus Hook, near Philadelphia, and at Bayonne, New Jersey. With branches, the line would be 1,445 miles long, one of the longest in the world.

Several such long-distance pipe line systems already operate in the United States, such as that from Wyoming to northern Illinois.

Another "longster" is being constructed from Baton Rouge, Louisiana, to Greensboro, North Carolina. This 1,000-mile steel conduit, with spur lines in Alabama, Georgia, and Tennessee, will carry gasoline, instead of crude oil.

Crossing the route of this line in Georgia is the new pipe system from Port St. Joe, on the Gulf Coast of Florida, to Chattanooga, Tennessee. It will also carry refined products instead of crude.

A new Portland, Maine, to Montreal, Canada, pipe line, which crosses New

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1873, and in 1912 the *West Virginia* sent seven landing parties ashore to search thoroughly for any bottles that might contain documents to back up the conflicting claims of other nations.

Various private individuals have claimed to own Palmyra; one sold it for $200. Another more recently put it on the market for $75,000.

Note: Palmyra is depicted in its strategic relationship to the Hawaiian Islands and the United States shipping routes on the Society's Map of the Pacific Ocean, which may be obtained from the headquarters of the Society in Washington, D. C.

Bulletin No. 2, October 20, 1941.

PALMYRA'S WALLS THAT CORAL BUILT HELP DEFEND THE UNITED STATES

The new seaplane base which the U. S. Navy has established at Palmyra Island will receive planes on its quiet lagoons, sheltered from the Pacific by natural breakwaters of coral rock. Waves breaking against the island's seaward reefs draw a white line of danger around the narrow strips of land. Although spoken of as one island, Palmyra consists of a string of 53 little islands of varying size, each separated from the others by shallow channels of water, and all lying around a series of lagoons in the arrangement characteristic of coral atolls. The westernmost islets are tiny and half-submerged, so that the oval atoll appears from a distance to be a horseshoe.

U. S. DEFENSE BASE SERIES

This is the eleventh of a series of bulletins on U. S. defense bases. Many of the other bulletins of the series are still available in limited quantities at the Washington, D. C., headquarters of the National Geographic Society. Teachers whose subscriptions began after this series started, or who wish to replace copies missing from their files, may obtain these bulletins free of charge as long as the supply lasts.

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Sad Revival for the "Merry Widow" Kingdom of Montenegro

THE V-for-Victory campaign of opposition to Axis conquerors in the invaded countries of Europe has found another battlefield, in the mountains rising above the east shores of the Adriatic. Montenegro, a pocket-edition kingdom that became part of Yugoslavia after the first World War, was revived (under Italy's supervision) by Axis efforts to dismember Yugoslavia during the summer of 1941. Yet the Montenegrins opposed the new regime so violently that by fall Italian planes and warships were bombing the mountain kingdom into submission.

Last-ditch resistance to conquerors was what brought Montenegro into existence. When the Turks overran Serbia after the Battle of Kossovo in 1389, the Serbs who wouldn't accept foreign rulers took refuge in high mountain fastnesses easily defended from invasion, and there organized the little "nation of no surrender." The miniature Switzerland of the Adriatic was called Tsernagora by the natives, Montenegro by the Italians, both meaning "Black Mountain," possibly in reference to the dark forests that once crowned historic Mount Lovćen. It is the "great Tsernagora, smallest among peoples," whose "mighty mountaineers" are praised in Tennyson's poetry.

Montenegrin Princess Now Queen of Italy

After the days of the country's 15th century Black Prince Stephen, who successfully fought off Turkish armies 63 times in 12 years, Montenegro was ruled by hereditary bishops until 90 years ago. The Hospodar, or chieftain, who governed the country from 1860 was proclaimed King Nicholas I in 1910. He was father of the Montenegrin princess, Elena, who is now Queen of Italy. When the World War started, Montenegro followed Serbia into battle on the side of the Allies, but German forces captured the capital early in 1916. King Nicholas was deposed when the long independent little nation united with Serbia, Croatia, and Slovenia to form the kingdom of Yugoslavia.

Montenegro's 5,000 square miles and half-million people have since then constituted roughly half the Yugoslavian province of Zetska, the most sparsely populated of the country's divisions. Montenegro's chief river, the Zeta, accounts for the name. Cetinje, capital of Montenegro since the Black Prince burned his former stronghold in a scorched-earth resistance against the Turks, became capital of the new province. Podgorica is the only other town of any size. The port of Kotor (illustration, next page), is the mountainous region's outlet to the sea.

The colorful costumes of Montenegro's people and the little kingdom's Graustarkian history are supposed to have inspired Franz Lehar's popular operetta, "The Merry Widow," with its tuneful story of adventures in "Monteblanco."

A Hungry Land of Mountaineer Psychology

Extending inland east of Kotor and the Dalmatian coast, north of Albania and south of Bosnia, the former Montenegrin kingdom is a rugged, inaccessible land where roads were long discouraged lest they open the way to invasion and conquest.

Usually tall and of powerful build, the Montenegrins are descendants of a race of warriors. They have a reputation for being fully armed and ready to fight at all times. Like other mountaineers, they are often suspicious of strangers, but exceedingly hospitable once their confidence has been gained. This famous hospitality, however, may represent real sacrifices; for the Montenegrin region, except

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Hampshire's White Mountains through a pass almost 2,000 feet above sea-level, will be completed in a few months. This line will deliver approximately 50,000 barrels of "crude" daily to Montreal. It will save tankers, which will unload at Portland after the voyage from Venezuela, an additional 2,000-mile round trip to the Canadian port through the St. Lawrence.

Note: For further material on oil and pipe lines, see "Today's World Turns on Oil," in the *National Geographic Magazine*, June, 1941. This article contains diagrams showing how an oil well is dug and how the well pumps up oil. For data on Oklahoma pipe lines, see "So Oklahoma Grew Up," March, 1941.

See also the GEOGRAPHIC SCHOOL BULLETINS for November 11, 1940, "Oil of Near East Involves U. S. and 11 Other Countries"; and March 9, 1936, for "Where Does the World Get Its Oil?"

Bulletin No. 3, October 20, 1941.

Photograph from Caterpillar Tractor Co.

UNDER THE EARTH'S SKIN, STEEL ARTERIES CIRCULATE THE PULSING "BLACK BLOOD" OF INDUSTRY

Crude petroleum, natural gas, gasoline, and other refined products are pumped through a pipe line network 321,000 miles long in the United States. With one-way traffic only, the pipe lines are a quick and efficient means of moving that part of the country's huge daily output of oil products which cannot be carried by the more than 146,000 tank cars and 2,000 tank vessels available. After mechanical ditch diggers prepare the pipe line's short cut across fields, mountains, deserts, and forests, trucks and tractors haul the heavy steel pipe into place to be buried. This pipe line, 20 inches in diameter, was laid in Illinois.

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Strategic Materials: No. 9, Antimony Is Lead's Partner

THE automobile driver never asks the garage attendant to check the car's gas, oil, and antimony. But without the latter unfamiliar metal the car doesn't start, nor would modern mechanized civilization roll along at the accustomed tempo. The United States Government has classified as "strategic" the brittle, bluish-white substance and is rationing it to grant priority to defense needs.

Its chief peacetime use is in storage batteries for automobiles. Antimony hardens the lead gratings of the battery to give the electrical "punch" that starts the motor. Each of the 30 million vehicles in the U. S. may contain an average of four pounds of the metal, since it enters also into the manufacture of bearings.

The defense emergency intensifies antimony's importance. Today's armies on wheels are set in motion by storage batteries using antimonial lead. Batteries supply the electric current on which submarines operate under water. Every bullet requires a small but vital portion of lead's companion metal. Its direct military uses are possibly more numerous than those of any other strategic metal.

Beauty Secret Becomes Bullets and Bombs

The ancients would have laughed uproariously at the thought of being unable to wage war without antimony. Known to them only in the antimony-sulphur compound still called by the Greek name, stibnite, it was the secret weapon of women only, who used it to paint their eyebrows and darken their eyelids and lashes. Egyptian eyes that saw the Pyramids built were beautified with it, and the Biblical siren Jezebel used it. An old name for it from Arabic countries, where it was the favorite make-up for half-veiled harem eyes, may be the source of the modern word, antimony.

The discoverer of this beautifying metal as a chemical element is a mystery man of science. *The Triumphal Car of Antimony,* published as the work of a 15th century German monk named Basil Valentine, introduced the element to the world. But modern research unmasks Valentine as a 17th century German chemist afflicted with modesty and a sense of humor, Johann Tholde. Alchemists brooded over the metal in a refined form which showed a four-pointed pattern over the surface, ascribing the "stars" to favorable planets until later science explained them as crystals. The refined metal is still known as "star antimony."

Instead of beating plowshares into swords, modern warfare changes the old beauty secret antimony into bullets and bombs. Embedded in the base of each cartridge or bullet is a highly explosive "primer mixture," which ignites with the concussion of firing the gun and in turn sets off the gunpowder that actually propels the missile. Big guns too require it (illustration, cover). It is used also in the firing pins of bombs to make them explode.

Strategic materials, according to the official definition of the Army and Navy Munitions Board, are "those essential to national defense, for the Supply of which, in war, dependence must be placed . . . on sources outside the . . . United States . . . ."

The GEOGRAPHIC SCHOOL BULLETINS have been presenting a series of articles on these materials, their use, their peculiar qualities, and the countries from which they are obtained. The following have already been described:

Chromium (No. 7)	Mica (No. 6)	Quinine (No. 2)
Manila Fiber (No. 4)	Nickel (No. 1)	Silk (No. 8)
Mercury (No. 5)		Tungsten (No. 3)

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for a few fertile valleys and coastal stretches, is a tumbled mass of barren, deforested mountains. So scant are its food supplies that tens of thousands of its citizens live on daily rations of nothing but bread and cheese. Because of the poverty of the land, many Montenegrins have emigrated, thousands of them reaching the United States.

Since the men have been so largely occupied with warfare, it has been the women's traditional job to till the patches of garden among the mountain rocks, tend the flocks, and do virtually all the productive work.

Note: Information on Montenegro may be found in "Kaleidoscopic Land of Europe's Youngest King," in the *National Geographic Magazine*, June, 1939; and "Dalmatian Days," January, 1928.

Montenegro appears on the Society's Map of Europe and the Near East, which may be obtained from the Washington, D. C., headquarters.

Bulletin No. 4, October 20, 1941.

© *Publishers Photo Service*

KOTOR IS THE GATE TO A "ROUGH ROCK THRONE OF FREEDOM"

The only seacoast of Montenegro now is a short stretch along the Adriatic southwest of Lake Scutari, where the little town of Antivari is the chief port. Once Montenegro ruled the port of Kotor (Cattaro) with its five great rock-walled bays. Conquerors took the seaside port, but the mountain heights that they could not capture remained Montenegrin. In peaceful times cruise ships and coastwise boats anchor at Kotor to drop passengers who want to make the dizzy automobile trip over a zigzag mountain road into Montenegro's capital, Cetinje. Mount Lovćen, near which this photograph was made, is the traditional stronghold of the little nation's heroes, who took refuge on its heights and defied the Turks. Forests now cut away made Lovćen the Black Mountain for which Montenegro was named.

The lead core of machine-gun, rifle, and pistol bullets is hardened with antimony, to preserve its shape through the heat of gunfire. A change of shape might alter the missiles' course and make them miss the target. The surprise weapon which Col. Shrapnel invented for the British to use against Napoleon in 1803 owes much of its deadly efficiency to antimony. Typical shrapnel today is a steel shell carrying 250 half-inch lead balls which on explosion scatter like hail. The lead spheres also are hardened with 12 per cent antimony.

The United States, with its principal mines in Idaho and Alaska, produces about one per cent of the world's output, and needs 45 per cent.

One of antimony's special spheres, since the 15th century Swiss alchemist Paracelsus put it into prescriptions, is medicine. In the form of tartar emetic, it may prove a life saver in case of poisoning.

Possibly four-fifths of it goes into circulation as lead's unnoticed and anonymous alloy. The United States' daily circulation of 41 million newspapers is one of the largest jobs handled by the working partnership of Antimony and Lead, Inc. Antimony serves the nation's network of communications also, to harden lead sheathing for telephone and telegraph cables (illustration, inside cover).

In combinations with tin, lead, and copper, antimony produces the anti-friction metals or "babbitt" of which ball bearings and bearing linings are made.

China for a while held practically a world monopoly on the antimony market, taking the metal from several hundred shallow mines chiefly in Hunan Province and shipping it 1,200 miles down the Yangtse River for export.

Yugoslavia is the chief producer in Europe. Since the outbreak of the war in China, the antimonial center of gravity has moved to the Western Hemisphere, and Bolivia and Mexico now lead world production. Mexico, where antimony was not mined until the Spanish-American War, supplies 60 per cent of Uncle Sam's imports. From small mines in the Andes not far from extensive tin deposits, mainly in Potosi, Bolivia now produces nearly a third of the world output of antimony, and a third of the U. S. imports.

Bulletin No. 5, October 20, 1941.

Photograph by Willard R. Culver

ANTIMONY MAKES TYPESETTING EASIER EVEN IN BENGALI

The script-like characters of the Bengali language, with their sharp corners and intricate curves, can be set up in linotype for newspapers because of the peculiar properties of type metal. The speed of newspaper printing is due in part to lead's melting ability; the clarity of the print is due to antimony. Like water, melted antimony expands upon solidifying, and when added to the lead and other ingredients of type metal it causes the mixture to swell slightly as it hardens and gives a clear, sharp cast to the linotype.

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